INTRODUCTION

This report presents documentation for an Excel filter criteria worksheet. Included are an explanation of the program features, suggestions for its use, a description of the worksheet, and copies of the filter criteria documents that were used as the basis for the spreadsheet.

FEATURES

The filter criteria spreadsheet determines filter requirements given the gradation of a base material. Both the current United States Bureau of Reclamation (USBR) and the United States Army Corps of Engineers (USACE) criteria are given.

The required input into the worksheet consists of upper bound and lower bound gradations for the base soil to be filtered. A graph displays four gradations - the original gradations, adjusted gradations if there is material larger than the #4 sieve, the USBR filter criteria, and the Corps filter criteria. A candidate filter gradation can be entered, or selected from a list of 76 ASTM and AASHTO standard gradations, if desired. The candidate filter gradation also appears on the graph to make it easy to determine if the candidate filter meets the USBR and USACE requirements. A table also indicates whether or not the criteria are met by the candidate filter.

SUGGESTIONS FOR USE

The filter criteria worksheet is to be used as a tool for designing filters according to either the USBR criteria or the USACE criteria. The worksheet should not be used as the only design aide. It is suggested that the designer read the design requirements published by these agencies. These documents are included in Appendices D and E.

With respect to the USBR criteria, the worksheet follows section 5.8 of the *Design Standards: Embankment Dams No. 13* (1994). Chapter 5 is entitled "Protective Filters", which includes criteria for filters, drains, and zoned embankment dams. The scope includes naturally occurring earth materials and filters manufactured from these materials. Filter fabrics are not included in this chapter. The filter criteria given in sections 5.7 through 5.12 are intended for design of those parts of the structure where filtering is the main purpose, as opposed to draining water to an exit, or preventing build-up of pore pressures. Section 5.8 describes "Determination of filter gradation limits" for filters in structures with significant hazard. An example of such a filter is one located downstream of the impervious core of a dam. Steps A through H are outlined in the document, and each of these steps is performed by the program. Section 5.8 and other pertinent sections should be read by the designer, and engineering judgment should be used in applying the computed results.